SAMSUNG

WASHING MACHINE
DRUM TYPE

Basic Model : WF455ARGSGR/A2
(GRACE-S PROJECT)

Model Name : WF45H6300AG
WF22H6300AG
WF45H6300AW
WF45H6100AP
(WF6000HA)

Model Code : WF45H6300AG/A2
WF22H6300AG/AX
WF45H6300AW/A2
WF45H6100AP/A2
(WF6000HA)

SERVICE Manual

WASHING MACHINE (DRUM)

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2. Features and Specifications
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Refer to the service manual in the GSPN (see the rear cover) for the more information.

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1. SAFETY INSTRUCTIONS

1-1. SAFETY INSTRUCTIONS FOR SERVICE ENGINEERS

► Be sure to observe the following instructions to operate the product correctly and safely to prevent possible accidents and hazards while servicing.

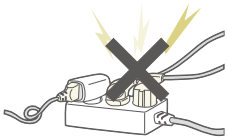
► Two types of safety symbols, Warning and Caution, are used in the safety instructions.

⚠ **WARNING**	**Hazards or unsafe practices that may result in severe personal injury or death.**
⚠ **CAUTION**	**Hazards or unsafe practices that may result in minor personal injury or property damage.**

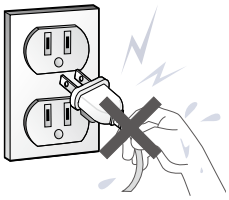
⚠ WARNING BEFORE SERVICING

- (When servicing electrical parts or harnesses) Make sure to disconnect the power plug before servicing.
  √ Failing to do so may result in a risk of electric shock.

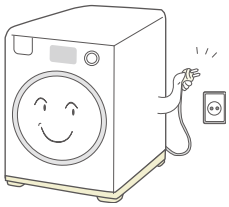
- Do not allow consumers to connect several appliances to a single power outlet at the same time.
  √ There is a risk of fire due to overheating.



- When removing the power cord, make sure to hold the power plug when pulling the plug from the outlet.
  √ Failing to do so may damage the plug and result in fire or electric shock.



- When the washing machine is not being used, make sure to disconnect the power plug from the power outlet.
  √ Failing to do so may result in electric shock or fire due to lightning.



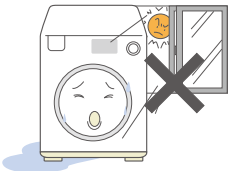
- Do not place or use gasoline, thinners, alcohol, or other flammable or explosive substances near the washing machine.
  √ There is a risk of explosion and fire caused from electric sparks.

⚠ CAUTION BEFORE SERVICING

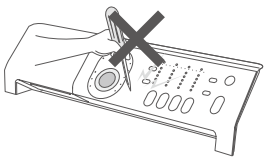
- Do not sprinkle water onto the washing machine directly when cleaning it.
  √ This may result in electric shock or fire, and may shorten the product lifetime.

- Do not place any containers with water on the washing machine.
  √ If the water is spilled, it may result in electric shock or fire. This will also shorten the product lifetime.

- Do not install the washing machine in a location exposed to snow or rain.
  √ This may result in electric shock or fire, and shorten the product lifetime.



- Do not press a control button using a sharp tool or object.
  √ This may result in electric shock or damage to the product.



⚠ CAUTION WHILE SERVICING

- When wiring a harness, make sure to seal it completely so no liquid can enter.
  √ Make sure that they do not break when force is exerted.

- Check if there is any residue that shows that liquid entered the electric parts or harnesses.
  √ If any liquid has entered into a part, replace it or completely remove any remaining moisture from it.

- If you need to place the washing machine on its back for servicing purposes, place a support(s) on the floor and lay it down carefully so its side is on the floor.
  √ Do not lay it down on its front. This may result in the inside tub parts damaging.

⚠ WARNING WHILE SERVICING

- Check if the power plug and outlet are damaged, flattened, cut or otherwise degraded.
  √ If faulty, replace it immediately.
  Failing to do so may result in electric shock or fire.

- Completely remove any dust or foreign material from the housing, wiring and connection parts.
  √ This will prevent a risk of fire due to tracking and electrical hazard.

- When connecting wires, make sure to connect them using the relevant connectors and check that they are completely properly.
  √ If tape is used instead of the connectors, it may cause fire due to tracking.

- Make sure to discharge the PBA power terminals before starting the service.
  √ Failing to do so may result in a high voltage electric shock.

- When replacing the heater, make sure to fasten the nut after ensuring that it is inserted into the bracket-heater.
  √ If not inserted into the bracket-heater, it touches the drum and causes noise and electric leakage.

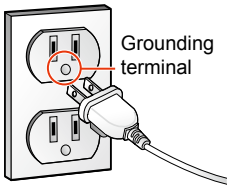
⚠ WARNING AFTER SERVICING

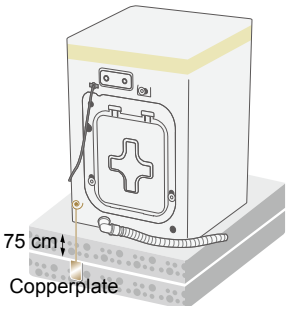
- Check the wiring.
  √ Ensure that no wire touches a rotating part or a sharpened part of the electrical harness.

- Check for any water leakage.
  √ Perform a test run for the washing machine course and check whether there is any water leakage through the floor section or the pipes.

- Do not allow consumers to repair or service any part of the washing machine themselves.
  √ This may result in personal injury and shorten the product lifetime.

- If it seems that grounding is needed due to water or moisture, make sure to run grounding wires.
  (Check the grounding of the power outlet, and additionally ground it to a metallic water pipe.)
  √ Failing to do so may result in electric shock due to electric leakage.
  [Running a grounding wire]
  - Twist a grounding wire (copper wire) two or three times around the tap.
  - If you connect the grounding wire to a copperplate, bury it 75 cm under the earth in a place with a lot of moisture.
    ⚠ Do not connect the grounding wire to a gas pipe, plastic water pipe or telephone wire. There is a risk of electric shock or explosion.



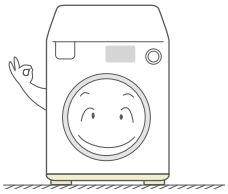


⚠ CAUTION AFTER SERVICING

- Check the assembled status of the parts.
  √ Now is a good time to inspect your work. Review all connections and wiring, including mounting hardware.

- Check the insulation resistance.
  √ Disconnect the power cord from the power outlet and measure the insulation resistance between the power plug and the grounding wire of the washing machine. The value must be greater than 10MΩ when measured with a 500V DC Megger.

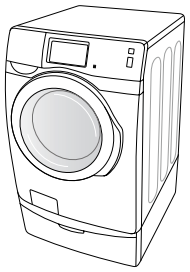
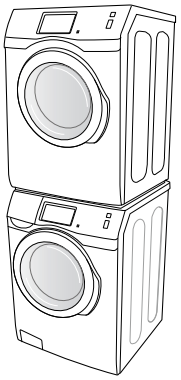
- Check whether the washing machine is level the floor with respect to the original position of the washing machine prior to service.
  By doing this now will reduce for the need of customer dissatisfaction and redo call.
  √ Vibrations can shorten the lifetime of the product.



2. FEATURES AND SPECIFICATIONS

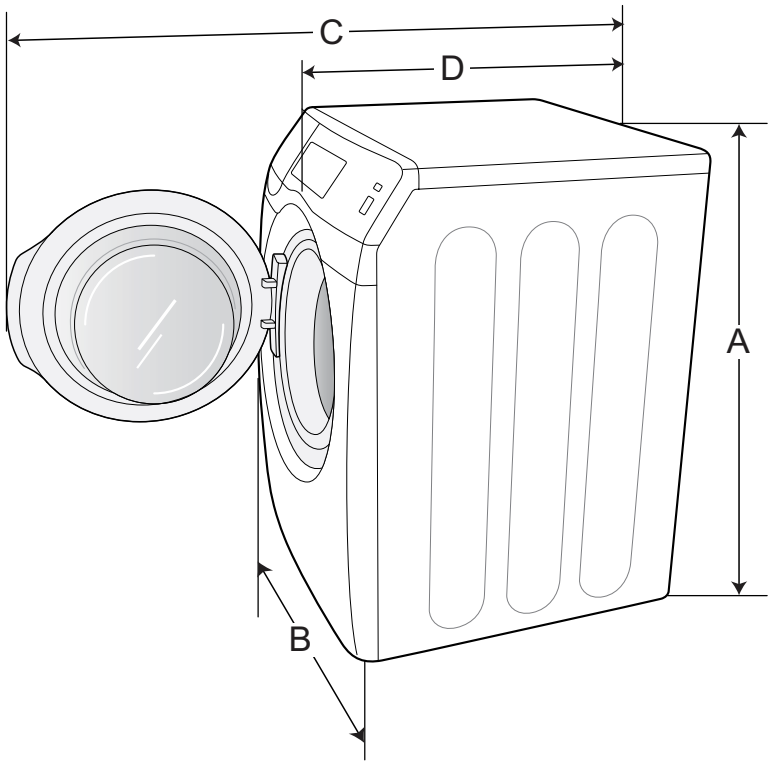
2-1. FEATURES

Features	Description
The Largest Capacity	• Samsung's extra-large capacity laundry machine can wash a full set of your Bedding PLUS, a kingsize comforter, or up to 31 bath towels in a single load. Since you don't have to do as many loads, you save time, money, water and energy.
8" LCD Touch Screen Display	• The brilliant 8" Color LCD Touch Screen displays cycle information, settings, options, and more. The easy-to-use interface allows you to scroll through all wash cycles with the slightest touch.
Smart Control	• Samsung's innovative Smart Control technology enables you to control your washer through personal technologies such as smart phones. You don't have to be on standby until the cycle ends. Smart Control allows you to monitor the washing process and let you know when the cycle is complete.
Smart Care	• Samsung's Smart Care, an automatic error-monitoring system, detects and diagnoses problems at an early stage and provides a quick and easy solution through LCD navigation. With the innovative Smart Control technology, you can also be alerted when the problem occurs via your smart phones.
PowerFoam™	• Samsung's effective PowerForm delivers improved cleanliness with advanced fabric care. • PowerFoam allows detergent to disperse evenly and penetrate fabrics faster and deeper.
SpeedSpray	• Samsung's new SpeedSpray technology saves you up to 25%* more time when doing laundry by shortening wash times while still keeping all segments of the washing process and getting your clothes clean. * Based on 8 pounds loads, Normal cycle, on previous and existing 4.3 cu.ft. Samsung front loading washers released until 2011 without SpeedSpray.
VRTplus™ (Vibration Reduction Technology)	• This Samsung washer minimizies noise and vibration with dual 3D vibration sensors and smart control technology, ensuring quiet operation.
Deep Steam	• The Deep Steam feature boosts cleaning performance and loosens grime and dirt, thus providing superior cleaning results.
Pure Cycle™ (Tub Cleaning cycle)	• Clean your drum with one button! This Pure Cycle is specially designed to remove detergent residue and dirt buildup in the tub, diaphragm, and on the door glass without the need for special chemical detergents.
Stylish Design	• The stylish design of this washer blends well with your environment.
Diamond Drum™	• Takes gentle care of your fabrics. With inside holes 36% smaller than those of conventional drums,the diamond drum prevents fabrics from sticking out through the holes and consequently being damaged.
DD Motor	• The power to handle anything! Our direct-drive inverter motor delivers power right to the washer tub from a variable speed, reversible motor. A beltless direct-drive motor generates a higher spin speed of 1,300 rpm for more effective, quiet operation. The washer also has fewer moving parts, meaning fewer repairs.

Features	Description
Pedestal with Storage Drawers (Model No : WE357*)	• An optional 15” pedestal is available to raise the washer for easier loading and unloading. It also offers a built-in storage drawer that can hold a 100 oz. bottle of detergent. 
Stacking (Model No : SK-5A/XAA)	• Samsung washers and dryers can be stacked to maximize usable space. An optional stacking kit is available for purchase from your Samsung retailer. 

2-2. SPECIFICATIONS

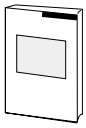
Model		WF45H6300AG WF45H6300AW WF45H6100AP WF22H6300AG	
Wash type		FRONT LOADING WASHER	
Dimension (Inches / mm)	**A: High-Overall**	38.7”984mm	
	B: Width	27”(686mm)	
	C: Depth with door open 90º	51.7”(1,314mm)	
	D: Depth	34’’(863.7mm)	
Water pressure		20 ~ 116psi(137~800kpa)	
Weight		105kg(231.5lb)	
Heater Rating		900 W	
Power consumption	**Washing**	120 V	200 W
	Washing and Heating	120 V	1,150 W
	Spin	120 V	550 W
	Drain	120 V	80/30 W
Spin revolution	**rpm**	1,300 rpm	



2-3. COMPARING SPECIFICATIONS WITH EXISTING MODELS

Project		WF6000HA BEST	WF6000HA BEST	GRACE S
Model Name		WF45H6300AG WF45H6300AW WF45H6100AP	WF22H6300AG	WF455ARGSGR
Image				
Capacity (cu.ft. IEC)		4.5 cu.ft	22kg	5.2 cu.ft
Main Spec	Motor type	DD Motor	DD Motor	DD Motor
	MAX RPM	1300	1300	1300
	VRT	Yes (VRT+)	Yes (VRT+)	Yes (VRT+)
	Heater (900W)	Yes	Yes	Yes
	Diamond Drum	Yes	Yes	Yes
	Washing Cycle #	13	13	14
	Delay Wash	24 hrs	24 hrs	24 hrs
	Tilted Drum	5°	5°	5°
	Sound pressure	MAX 61.0 dBA↓	MAX 61.0 dBA↓	MAX 61.0 dBA↓
Target Performance	MEF	3.4↑	3.4↑	3.4↑
	WCF	2.75↓	2.75↓	2.75↓
	kWh/year	95 kWh/year↓	95 kWh/year↓	95 kWh/year↓
Design	Control Display	TOUCH + LED	TOUCH + LED	TOUCH + LED
	Frame Color	Stratus Grey	Stratus Grey	Stratus Grey
	Dimension (W*D*H)	27”x34”x38.7”	27”x34”x38.7”	27x34.1x38.7”

2-4. OPTIONS SPECIFICATIONS

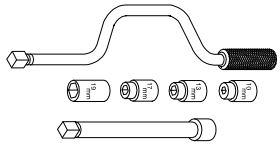
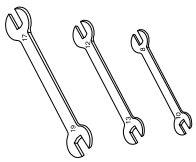
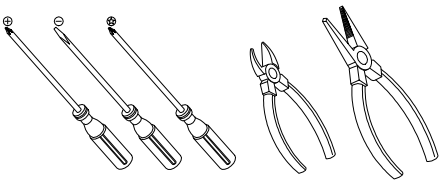
Item		Code	QTY	Remarks
	BOLT-SPANER (Wrench)	DC60-40146A	1	Default
	ASSY HOSE WATER	DC97-15648A	1	Default
	ASSY HOSE WATER	DC97-15648B	1	Default
	MANUAL USER	DC68-03385B	1	Default
	CAP-FIXER	DC67-00307A	6	Default
	HOSE-HANGER	DC62-10278A	1	Default

Note

- Customer can purchase additional water supply and drain hoses from a service center.
- The spanner(wrench), water supply and drain hoses are not supplied. Both the water supply and drain hoses are supplied during the installation.

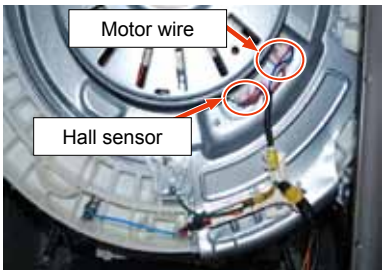
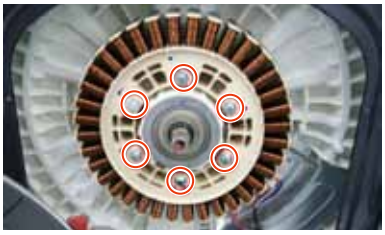
3. DISASSEMBLY AND REASSEMBLY

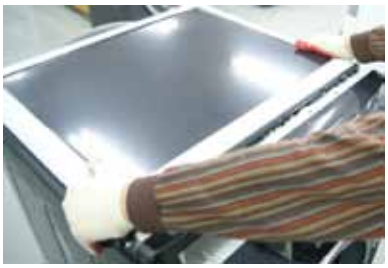
3-1. TOOLS FOR DISASSEMBLY AND REASSEMBLY

Tool		Type	Remarks
	Socket Wrench with 6” Extension	10mm 13mm 19mm	Heater (1) Motor (1), Balance (5), 2 holes of each left and right of the shock absorber 1 Pulley hole
	Open End wrench	10mm 13mm 19mm	Replaceable for the box driver. Since the bolt runs idle when the box driver is used, use the box driver 17mm.
	Vice pliers		Tool to protect the idle and abrasion of the bolt for the box driver.
	Others (Driver, Nipper, Long nose)		General tools for the after service.

3-2. STANDARD DISASSEMBLY DRAWINGS

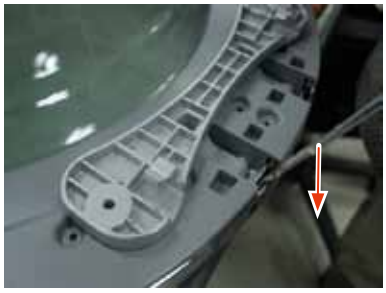
► This is a standard disassembly diagram and may differ from the actual product.
Use this material as a reference when disassembling and reassembling the product.

Part	Figure	Description
Disassembling and Repairing the Rear Motor		1. Remove the 2 screws holding the Back-Cover at the back of the washing machine and separate the Back-Cover pushing it downwards. (Assemble it by lifting it upwards)
		2. After separating the Back-Cover, remove the M19 nut holding the Motor. ⚠ To remove it, turn it counter-clockwise. As the Motor also rotates if the nut is turned slowly, torque it quickly and firmly in a single action. ✎ Do not remove the nut by inserting a screwdriver into the Motor, as this may result in a problem with the motor.
		3. Remove the M19 nut and washer and then separate the Rotor. ⚠ Since removing the rotor requires a lot of strength due to the magnetic force of the Rotor and it may come off suddenly, your hand or arm may be injured by the edge of the Stator or Frame. Therefore take precaution when separating it. ✎ You can separate the connector by pressing the navel of the Housing and pulling it outside.
		4. Separate the Motor Wire and Hall Sensor while pressing the navel of the Housing. Take precaution when you do this because the Hall Sensor part is easily shocked. sensor part is easily sho
		5. Separate the 6 M10 screws. → Separate the Assy Bracket Motor → Separate the Stator. ✎ When removing the last of the 6 screws, hold the Stator as it may fall when the screws are removed.
	* **Check Points for Troubleshooting** 1. Check if there is any alien substance between the Rotor and the Stator. 2. Check if the motor power (Blue, White, Red) wire is connected. 3. Check if the Hall Sensor wire is connected. ✎ The order of the motor wires is Blue, White, and Red from the right. Check if the resistance between Blue-White, White-Red, and Red-Blue is equal to 15Ω.	

Part	Figure	Description
Separating the Cover_Top and Panel-Control (Check Main-PCB and Sub-PCB)		1. Remove the 2 hexagon screws, which are at the back, fixing the COVER-TOP.
		2. Disassemble the COVER-TOP by sliding it backwards and remove the 4 screws on the PANEL-CONTROL.
		3. With the top cover removed you will now have access to service the Water pressure sensor, EMI Noise Filter, Hot and Cold Water Valves, Steam ASSY, Hose Draw ASSY, And main PCB ASSY.
		4. Press the Separate button to separate the ASSY Drawer.
		5. Disassemble the HOUSING-DRAWER frome the PANEL-CONTROL (push back and then push Housing-drawer upside to separate).

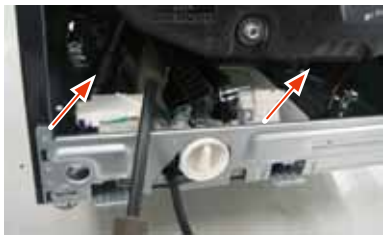
Part	Figure	Description
Separating the Cover_Top and Panel-Control (Check Main-PCB and Sub-PCB)		6. Pull the PANEL-CONTROL towards and then lift it upwards to separate.
		7. Carefully disconnect the three wiring connectors by hand.
	592-493* Assy Panel Control 592-493* Assy Panel Control	8. Remove the all screws holding the PCB and release the hooks on both sides to remove the PCB for repair / replacement.

Part	Figure	Description
Separating the Main PCB		1. Remove the 2 screws holding GUIDE-PCB(M) at BRACKET-SPRING(R).
		2. Separate 2 Hooks.
		3. Open COVER-PCB(M).
		4. Disconnect All Connectors on main PBA.
		5. Lift up Main PBA, Change SVC Part. After SVC, Certainly check the all Hooks on COVER-PCB(M) Otherwise COVER-PCB(M) will be disassembled during washing machine running.

Part	Figure	Description
Disassembling and Reassembling the Door Part		1. Remove the 2 screws holding the HINGE-DOOR and the FRAME-FRONT. 2. Disassemble the ASSY DOOR lifting it up slightly.
		3. Remove the 10 screws fixing the HOLDER-GLASS. (including the 2 blue screws holding the LEVER-DOOR, including the 3 arrow screws holding the HINGE-DOOR.)
		4. Putting and pressing hard a flat-head screwdriver into the furrow between COVER-DOOR and SUPPORT-HINGE.
		5. Making a semicircle with screwdriver. (Disassemble the hooks)
		6. Disassemble the HOLDER-GLASS from COVER-DOOR Take the DOOR-GLASS , SUPPORT-HINGE, HINGE-DOOR.
	* Check Points for Troubleshooting • Check the status of the screws holding the Hinge (check if they are loose). Check if the front and rear of the door and the hinge part are not damaged.	

Part	Figure	Description
Disassembling the Front Cover/Frame front (check the Door Lock S/W)		1. Pull the DIAPHRAGM upside, and finfish disassembling along the circle.
		2. Remove the 2 screws to separate the DOOR LOCK S/W.
		3. Remove the 4 screws at the top of FRAME-FRONT.
		4. Push the lever and pull it towards to open the COVER-FILTER.
		5. Separate the remaining WATER REMOVAL HOSE (BLUE) from the hook.
		6. Remove the 2 screws down under Frame Front.
		7. Separate the FRAME-FRONT.

Part	Figure	Description
Disassembling and Repairing the Water Supply Valve		1. Remove the Top Assy-Plate. 2. Disconnect the water supply valve wire connector.
		3. Remove the 4 screws holding the water supply valve.
		4. Remove the hose connected to the valves. (Use the plier to remove the hose.)
Disassembling and Repairing the Water Level Sensor		1. Separate the wire connected the SENSOR-PRESSURE. 2. Adjust the plastic clip(of pressure sensor) between two nose of plier, then grip and pull the plastic clip with caution. (Use the long nose plier to push the hook).
		3. Remove the hose from the SENSOR-PRESSURE.
Disassembling the inside Detergent Box		• Hold the Clamp of the Detergent Box and disassemble the Hose-Drawer-Tub.

Part	Figure	Description
Disassembling the Pump Motor Part		1. Remove the 2 Cover pump.
		2. Separate the Clamp of the hose connected to the PUMP and then pull the DRAIN-HOSE. 3. Separate the Clamp of the hose connected to the PUMP and then pull the HOSE-AIR. 4. Separate the Clamp of the hose connected to the PUMP and then pull the HOSE-DRAIN.
		5. Separate the wire connected to the PUMP.
Removing the Remaining Water		• If the washing machine works, drain the water in the wash tub by selecting the Spin course. If the washing machine does not work, remove the laundry from the wash tub and scoop the remaining water out of the tub using a cup.

Part	Figure	Description
Disassembling the Tub		1. Remove the 2 screws fixing GUIDE-WIRE, 6 screws fixing FRAME-PLATE(U).
		2. Remove the 3 bolts fixing WEIGHT BALANCER and then pull it towards with caution.
		3. Remove the 4 bolts fixing DAMPER to take ASSY TUB out. 4. Remove all wire and hose connected the ASSY-TUB.
		5. Open the cap of SPRING-HANGER to take ASSY-TUB out.
		6. Lift the ASSY-TUB with two people carefully with holding SPRING-HANGER.

Part	Figure	Description
Disassembling the Tub		7. Remove the M10 bolt from the middle of the TUB and separate the TUB-FRONT and TUB-BACK.
Disassembling the DRUM		1. Separate the ASSY DRUM from TUB, remove 6 M10 bolts from the upper ASSY DRUM, disassemble the ASSY FLANGE SHAFT.
		2. Remove 12 screws from the outer sides and then remove the two upper and lower BALL BALANCERS.
		3. Remove 3 screws from the outer sides and then remove the 3 DRUM-LIFTERS.

<table>
<tr><th>Part</th><th>Figure</th><th>Description</th></tr>
<tr><td rowspan="2">Separating the Heater at the Bottom Front</td><td rowspan="2"> </td><td>1. Disassemble the Front-Frame.
2. Separate the connection wire.
- Separate the Thermostat fixed at the bottom of the Tub.
(Take precaution as there may be water remaining.)
Make sure to separate the Thermostat first and then separate the Heater. If you fail to observe this order, it may result in a shock and be damaged.
3. Release the nut holding the Heater with an M10 tool and then separate the Heater.
Do not completely release the nut.
Pull the Heater forward after releasing the nut. If the Heater is damaged, it may cause a problem. Therefore unfasten the nut using spanner or wrench manually without using pincers or tweezers.
⚠ When you re-assembly the heater, make sure to install the Heater exactly onto the Bracket inside the Tub. If it is not properly installed, it may cause a fire. In addition, completely insert the packing part into the Tub when assembling it so that the packing part is completely attached onto the Tub.</td></tr>
<tr><td colspan="2">* Check Points for Troubleshooting
1. Check if the resistance of the Heater is equal to 27.1Ω (for the 1900W product), or 26.2Ω (for the 2000W product).
2. Check if the resistance of the Thermistor is equal to 12kΩ (at room temperature).</td></tr>
<tr><td>Disassembling The MEMS Sesnor</td><td> </td><td>1. Remove the 2 screws From MEMS Sensor.
2. Separate the wire Connecter.</td></tr>
</table>

Reassembly is in the reverse order of the removal.

4. TROUBLESHOOTING

4-1. ERROR MODES

► **This is a washer integrated error mode. For detailed information, refer to the general repair scripts.**

Error Type	For USA	Causes	Remarks
Water Level Sensor	1E	- The part of the hose where the water level sensor is located is damaged (punctured). - The hose is clogged with foreign material. - The hose is folded. - Too much lubricant has been applied to the insertion part of the air hose. - Hose engagement error. (disengaged) - Part fault. (Faulty internal soldering) - The water level sensor terminal is disengaged. - Main PBA fault.	
Motor Driving Error and Hall Sensor Error	3E	- The PBA connector terminal is not connected. - The motor spin net is not engaged. - The motor's internal coil is damaged. (short-circuited or cut) - The hall sensor terminal is not connected. - Foreign material (a screw) has entered the motor. - Motor overloaded due to too much laundry. (Non-sensing) - The motor hall sensor terminal is not connected. - PBA fault. - The motor driving error from the PBA is weak. Unstable relay operation, etc. - This occurs due to erroneous operating signals from the motor hall sensor. - The IPM terminal of the main PBA is not connected. - The DD motor cover is out of place. - The PCB housing terminal is not connected. - PBA fault. - DD motor fault.	This error occurs because of restrained revolutions. This error occurs when an interference is generated due to too much laundry, etc.
Water Supply Error	4E	- Foreign material is entering the water supply valve. - The water supply valve terminal is not connected. (Wire disconnected) - The warm water and rinse connectors are wrongly connected to each other. - This occurs if the PCB terminal from the drain hose to the detergent drawer is not connected. Check whether the transparent hose is folded or torn.	
	4E2	- The cold and warm water supply hoses are wrongly engaged into each other. - The temperature of the water supplied through the dry valve during a dry cycle is sensed as higher than 70 ˚C. - The water temperature is sensed as higher than 50 ˚C in the Wool or Lingerie courses.	The water supplied for 1 minute drying the drying cycle is 0.3 ~ 0.4 L.
Drain Error	5E	- The pump motor impeller is damaged internally. - The wrong voltage is supplied to the parts. - Part fault. - This occurs due to freezing in the winter season. - The drain hose is clogged. (Injection error, foreign material) - Clogged with foreign material. - The water pump terminal is not connected: rubber band, bills, cotton, hair pins, coins have collected inside the drain pump ASSY.	

Error Type	For USA	Causes	Remarks
Power Error	9E1,9E2	- Check the consumer's power conditions. : Make sure to check the operating voltage. Connect a tester to the internal power terminals during the Boil or Dry operations and observe the washing machine's operation carefully. : Check the voltages. (An error occurs when under or over voltage is supplied.) : Check whether a plug receptacle is used. When the connecting wire is 1m, a momentary low voltage may drop up to 10 V - Main PBA fault (sometimes)	
Communication Error	AE	- The signals between the sub and main PBAs are not sensed because of commuication error. - Check the connector connections between the sub and main PBAs carefully. → Check for incorrect or loose connections, etc. - Remove the sub PBA C/Panel and check for any faulty soldering.	
	AE3	- The signals between The DR Module and main PBAs are not sensed because of commuication error. - Check The connector connections between The DR Module and main PBAs carefully. → Check for incorrect or loose connections, etc. - Remove The DR Module and Check for any faulty soldering.	
	AE4	- The signals between The WIFI Module and main PBAs are not sensed because of commuication error. - Check The connector connections between The WIFI Module and main PBAs carefully. → Check for incorrect or loose connections, etc. - Remove the WIFI Module and Check for any faulty soldering.	
	AE5	- The signals between The LCD Module and main PBAs are not sensed because of commuication error. - Check The connector connections between The LCD Module and main PBAs carefully. → Check for incorrect or loose connections, etc. - Remove The LCD Module and Check for any faulty soldering.	
	AE6	- The signals between the Inverter PBA and main PBA are not sensed because of communication error. - Check The connector connections between the Inverter PBA and main PBA carefully. → Check for incorrect or loose connections, etc. - Remove the Inverter PBA and Check for any faulty soldering.	
Switch Error (Main Relay Error)	bE2	- The Power button is pressed continually. (for more than 12 seconds). - A switch is jammed or stuck due to be pressed unevenly due to deformation of the control panel or button. - This error may occur when the screws that hold the sub PBA in place are tightened too much. - A button other than the Power button is continually pressed. (for more than 30 seconds). - Deformation of an internal plastic injection part. - A screw for assembling the sub PBA is tightened too much.	

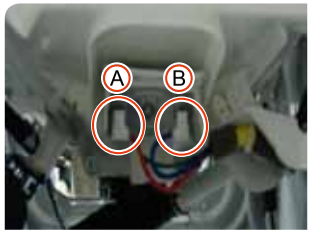
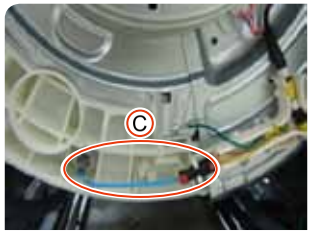
Error Type	For USA	Causes	Remarks
Door Error	dE	- A switch contact error because of a deformation of the door hook. - When the door is pulled by force.	When the door is not opened after the door open operation.
		- This occurs in the Boil wash because the door is pushed due to a pressure difference from internal temperature changes.	When the door is not locked after the door close operation.
	dE1	- The door lock switch terminal is connected incorrectly. - The door lock switch terminal is broken. - This occurs intermittently because of an electric wire leakage - Main PCB fault.	
Heater Error	HE,HE1	- The washing heater is short-circuited or has a wire disconnected. - The washing heater in the tub has an error. (Contact error, temperature sensor fault) - If the water level sensor operates without water because water is frozen or for any other reason and the temperature sensor engaged at the bottom to prevent overheating for the washing heater detects a temperature of 100 to 150 ˚C, the washing machine turns the input power off.	If the heater has no error, this occurs because of a PBA relay malfunction.
Water Leakage Error	LE	- Heater engagement fault. (out of place) - The air hose is out of place and water leakage occurs during the spin cycle. - The tub back at the safety bolts fixing part is broken. - Water leakage occurs at the front with foaming because of too much detergent. - Water leakage occurs because the connecting hose to the detergent drawer is connected incorrectly. - The drain pump filter cover is engaged incorrectly. - Water leakage occurs at the drain hose. - The duct condensing holding screws are worn. - The nozzle-diaphragm is engaged in the opposite direction or the rubber packaging is omitted. - Water leakage occurs because the screws that hold the tub back and front in place are fastened incorrectly. - The leakage sensor is faulty.	
Overflow Error	OE	- Water is supplied continually because the water level detection does not work. - Because the drain hose is clogged and there is an injection error (at a narrow section), the water level detection does not work and water is supplied continually. - Water is supplied continually because of freezing or because there is foreign material in the water supply valve. - This error may occur when the water level sensor is degraded.	This error occurs because the water level sensor terminal is out of place.
Temperature Sensor Error	tE1	- The washing heater sensor in the tub has an error. (Contact error or temperature sensor fault) - The connector is connected incorrectly or is disconnected. - If the water level sensor operates without water because the water is frozen or for any other reason and the temperature sensor engaged at the bottom to prevent overheating for the washing heater detects a temperature of 100 to 150 ˚C, the washing machine turns the input power off.	Heater sensor fault : When the connector is connected incorrectly or has a wire disconnected or contact error
Unbalance Error	UE	- As laundry causes this error, check the laundry. - Find the reason for the unbalance and solve it as directed in the user manual.	
Foaming Detected	SUd	- This occurs when too much foaming is detected. It is also displayed while foaming is removed. When the removal is finished, the normal cycle proceeds. “Sud” or “SUdS” is displayed when too much foaming is detected and “End” is displayed when the removal of the foaming is finished. (This is one of the normal operations. It is an error for preventing non-sensing faults.)	

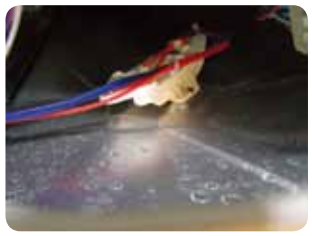
Error Type	For USA	Causes	Remarks
Mems PBA Error Detected	8E1	- Error detected in the Mems PBA or data error detected. Check the wire connections. Replace if necessary. 1. Check the wire connections. 2. Replace the Mems PBA.	
	8E2		
	8E		
System Error	SF1	- Micro Controller Operation Fail.	Replace Assy PCB.
	SF2		
	SF3		

► These are common troubleshooting procedures for each drum-type washer error mode. For detailed information, refer to the general repair scripts.

Error Type	Error Mode	Causes	Corrective Actions	Description of Photo
Water Level Sensor	1E	• Water level sensor fault • Incorrect connections of the water level sensor terminal • The hose part for the water level sensor is folded. • Main PCB fault	• Check the water level sensor terminal connections and contacts. • An error occurs if an incorrect water level sensor is used. Make sure to check the material code. (Abnormal operation) • If the water level sensor is faulty, replace it. • If the error persists despite taking the action above, replace the PBA.	 Check the water level sensor frequency. - Check it after the water level sensor and the connector are connected. ☑ Checking Part : Pink Color Wire Orange Color Wire. - Frequency : Approx. 25.5 KHz with no load
Washing Motor Error and Hall Sensor Error	3E	• Washing motor fault • Washing motor hall sensor fault • Incorrect connections of the washing motor/hall sensor connector • Washing motor rotor and stator fault • Main PCB fault	• Check the motor connector terminal connections and contacts. • 3E is displayed because overloading occurs due to too much laundry. • If the hall sensor terminal is faulty, replace the hall sensor. • Check whether the stator of the motor cover is damaged. • Check for coil disconnections due to foreign material. • If the PBA control circuit is faulty, replace the PBA.	 ► Check the motor Winding Coil Plug out the connector and read resistances at any two of the three terminals on Motor : Should be 6.0 Ω (at 25°C) ► Check the motor Hall Sensor Check the resistance on the main PCB motor (Between pins 1 and 3, and 1 and 4 of the four (4) pins) - Resistance : Approx. 2 to 4 MΩ - Check the voltage when the power is on.

Error Type	Error Mode	Causes	Corrective Actions	Description of Photo
Water Supply Error	4E	• Water supply value fault • Main PCB fault • Freezing in the winter season	• If the water supply valve has a wire disconnected, replace it. • Check whether the water supply valve is clogged with foreign material and whether water is supplied continually. • Check whether no water is supplied because of freezing in the winter season. • If the PBA relay operates abnormally, replace the PBA.	 1. Check the resistance for the water supply valve. - Resistance: 0.9~1.1kΩ between the terminals of the water supply valve. 2. Check whether there is foreign material in the water supply valve filter. 3. If the water supply valve filter is clogged, clean filter.
Drain Error	5E	• Freezing in the winter season • Foreign materials in the drain pump • Poor physical connection • Drain pump fault • Main PCB fault	• If the drain pump revolutions are restrained due to freezing in the winter season, check the method to remove the freezing and remove as directed. • Check whether the revolutions of the drain pump motor are restrained by foreign material, and remove as directed. • Check the wire connectors on Main PCB and Drain Pump ASSY. The connector or wire may have poor physical connection. • Check the drain pump resistance.	 Check the drain pump resistance. - Drain : Resistance : 13.5Ω ~ 16.5Ω - Bubble : Resistance : 18.75Ω ~ 22.75Ω
Communication Error	AE	• The signals between the sub and main PBAs are not sensed. • Incorrect wire connections between the sub and main PBAs.	• Check the wire connections and terminal contacts between the sub and main PBAs. • Check for disconnected wires. • Check whether the sub PBA is short-circuited because of moisture. • If the main PBA's communication circuit is faulty, replace it.	-

Error Type	Error Mode	Causes	Corrective Actions	Description of Photo
Door Error	dE dE1	• Door switch fault • Main PCB fault	• If a dS error occurs, check whether it occurs during the Boil cycle. - If it is detected that the door is open, close the door. • The 120V is directly connected to the door. Check and repair the power wire connections and insulation state. • Check the door switch. Replace if faulty. • Check the main PBA door sensing circuit. Replace if faulty.	 ► TYPE 1 Check the door switch Resistance. The resistance of 1 and 3 Pin Must be approximately 175Ω.
Heater Error	HE,HE1	• Disconnection wire • Heater falut • Wash-thermistor fault	• Check for connection between wire and heater. • If wash heater is faulty, replace it. - Refer the TYPE 1 • If it is not problem in heater, replace wash-thermistor - Refer the TYPE 2	 [FRONT] ► TYPE 1 Check the resistance between A and B. It should be 16.05±0.65Ω.  [BACK] ► TYPE 2 If TYPE 1 is OK, Change a wash-thermistor at back of Tub.

Error Type	Error Mode	Causes	Corrective Actions	Description of Photo
Water Leakage Error	LE	• Check for any leakage. • Foreign material in the DV case • Fault of a hose or incorrect part engagement in the product	• Check for any leakage on the base, Hose, Valve and Tub connections and take any required action. • During natural draining, this error occurs because the drain bellows are clogged with foreign material. Remove the foreign material. • Check the drain motor operation. Replace if it does not operate normally.	 ► DRAIN PUMP TYPE (Automatic Drainage) Check whether there is any foreign material in the bellows. Check for any foreign material, such as underwear wires or coins.
				 ► PUMP TYPE Check for any leakage on the base, Hose, Valve and Tub connections.
Overflow Error	OE	• Water level sensor fault • Freezing in the winter season	• If the water level sensor has a functional error, replace it. • Check the hose. This error occurs if it is torn or has a hole. • This error occurs if water is frozen in the winter season. Use hair dryer to defrost hose. Consider relocating the unit to warmer location.	 Check the hose connected to the water level sensor. Check whether the hose is folded, cut, or damaged.

Error Type	Error Mode	Causes	Corrective Actions	Description of Photo
Temperature Sensor Error	tE1	• Washing temperature sensor fault • Dry temperature sensor fault • Faulty and incorrect connections of the dry condensing sensor • Main PCB fault • Freezing in the winter season	• Check the connections for the washing heater temperature sensor connector. • If the washing heater temperature sensor has a functional error, replace it. - A tE error occurs. • Check the connections for the dry heater temperature sensor connector. • If the dry heater temperature sensor has a functional error, replace it. • Check the connections for the duct condensing temperature sensor connector. • If the duct condensing temperature sensor has a functional error, replace it.	-
Unbalance Error	UE	• Motor hall sensor fault • Caused by the laundry contents	• Check the type of laundry. Check whether they may cause an unbalanced situat ion. - Educate the consumer in this case is to press pause reposition the load or remove a few items. Press start to continue and complete the wash cycle.	-

5. PCB DIAGRAM

5-1. MAIN PCB

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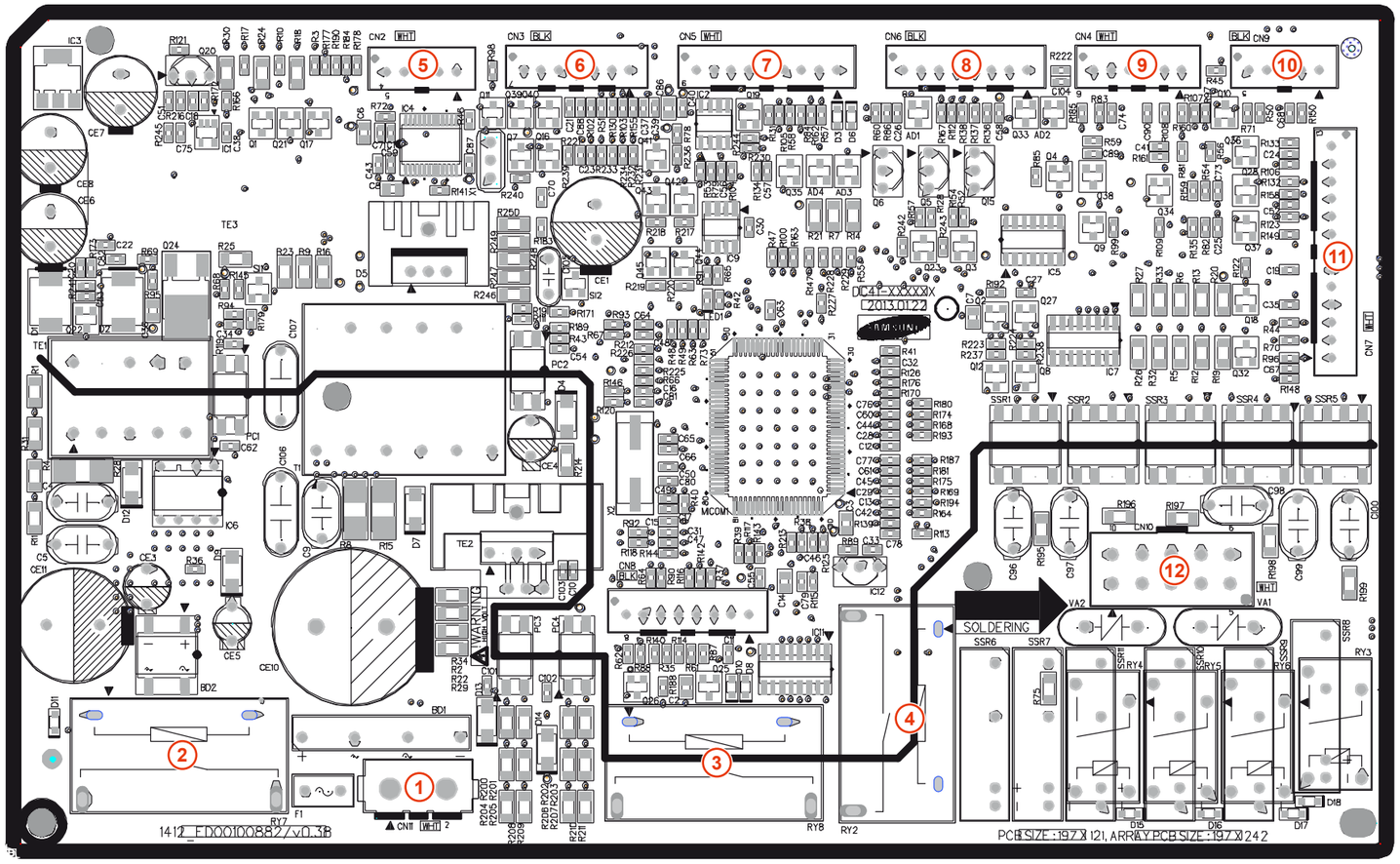

Location	Part No.	Function	Description
1	CN11	PBA Power Supply	Supply 120V of AC power.
2	RY7	Main Relay	Be Supplied PBA power when the Power button is pressed.
3	RY8	Dry Heater Relay	The switch for the Dry Heater power.
4	RY2	Washing Heater Relay	The switch for the Washing Heater power.
5	CN2	Fan motor Connection Port	Supply the 3-phase drive voltage for the FAN Motor.
6	CN3	MEMS Connection Port	Supply power to the MEMS PBA and provides a communications function.

Location	Part No.	Function	Description
7	CN5	Smart dispenser Connection Port	Supply power to the dispenser PBA and provides a communications function.
8	CN6	Sensor Connection Port	Supply power to the sensor and provides a communications function.
9	CN4	LCD PBA Connection Port	Supply power to the LCD PBA and provides a communications function.
10	CN9	Flash Writing Connection Port	Provides writing Flash memory.
11	CN7	SUB PBA Connection Port	Supply power to the SUB PBA and provides a communications function.
12	CN10	Each Load Connection Port	The port to supply power for each electric device.

5-2. CIRCUIT DIAGRAMS OF MAIN PARTS FOR MAIN PCB

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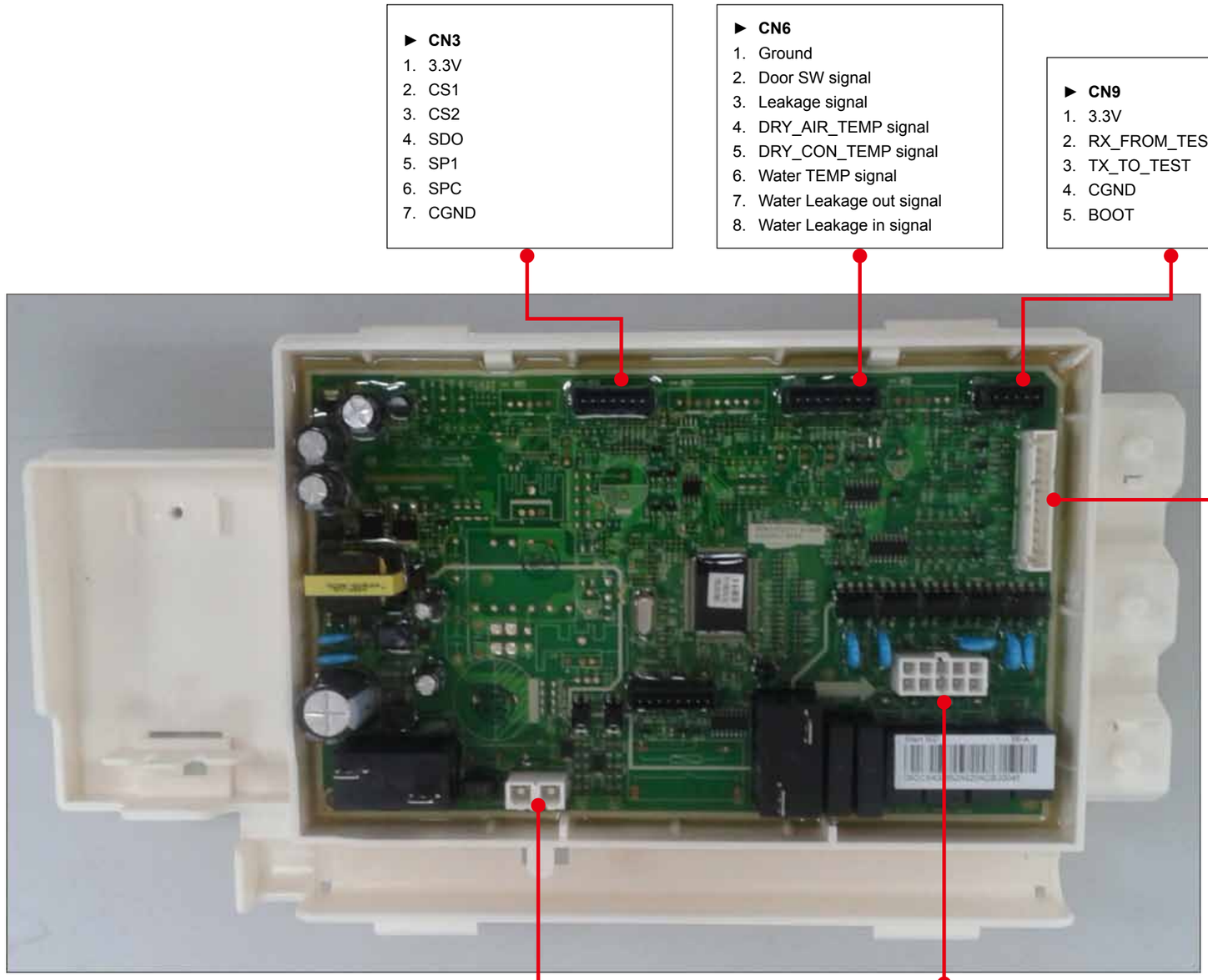

► **CN3**
1. 3.3V
2. CS1
3. CS2
4. SDO
5. SP1
6. SPC
7. CGND

► **CN6**
1. Ground
2. Door SW signal
3. Leakage signal
4. DRY_AIR_TEMP signal
5. DRY_CON_TEMP signal
6. Water TEMP signal
7. Water Leakage out signal
8. Water Leakage in signal

► **CN9**
1. 3.3V
2. RX_FROM_TEST
3. TX_TO_TEST
4. CGND
5. BOOT

► **CN7**
1. SUB Communications signal
2. SUB Communications signal
3. SUB Reset signal
4. 5V
5. Ground
6. 12V
7. Empty pin
8. Power SW signal
9. Water leakage signal
10. 5V
11. Inverter Communications signal
12. Inverter Communications signal
13. Ground

► **CN1**
1. L line
2. Door signal

► **CN10**
1. Actuator signal
2. Door lock signal
3. Door unlock signal
4. Circulation pump signal
5. Drain pump signal
6. Cold valve signal
7. Hot valve signal
8. Pre valve signal
9. Dry valve signal
10. Water shot signal

5-3 INVERTER PCB

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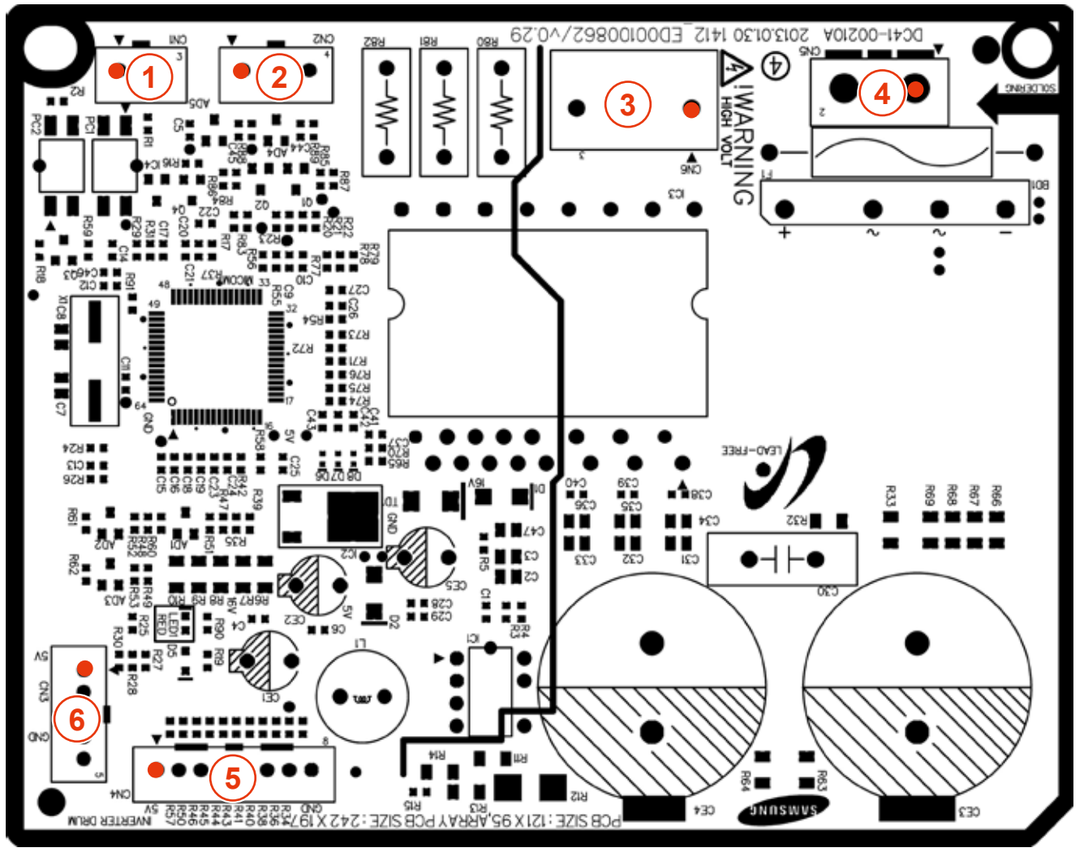

Location	Part No.	Function	Description
1	CN1	Communication	Communication with MAIN
2	CN2	Hall Sensor	Sensing Hall signal
3	CN6	Motor Output	MOTOR 3-Phase Output
4	CN5	AC Power Source	Supply AC Power
5	CN4	JTAG Connector	Debugging connector (Deleted in massproduction)
6	CN3	Flash Writing Port	Writing Flash memory

5.4. CIRCUIT DIAGRAMS OF MAIN PARTS FOR INVERTER PCB

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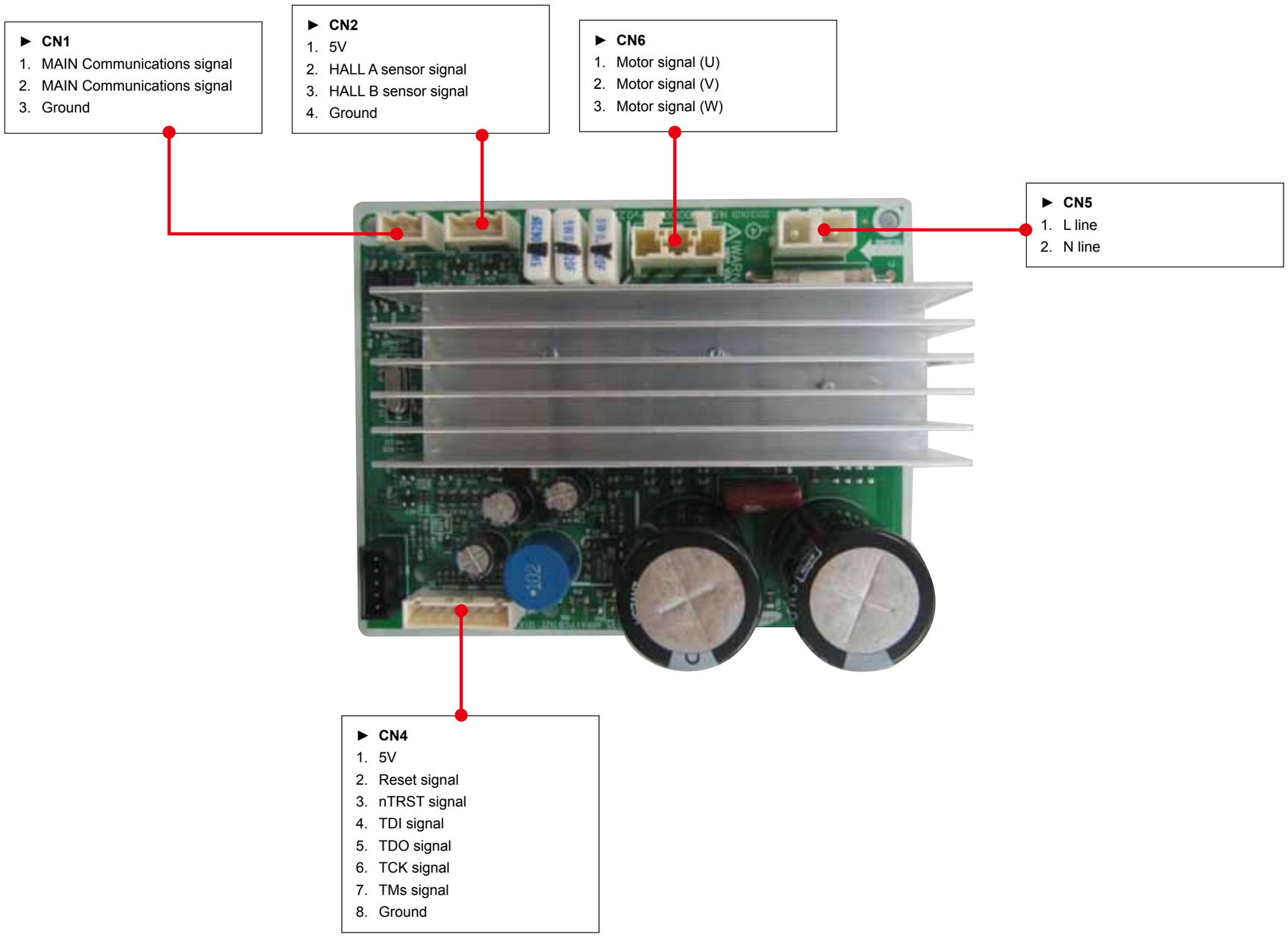

5-5. SUB PCB

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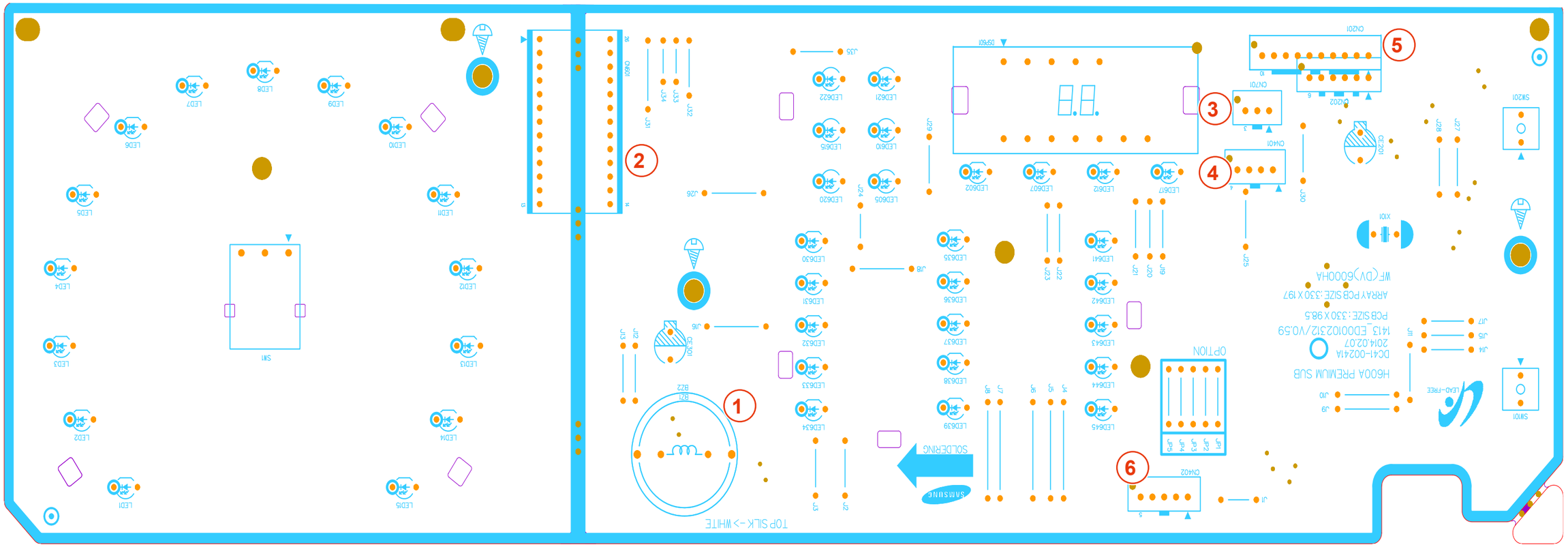

Location	Part No.	Function	Description
1	BZ1	Buzzer Circuit	Be generated sound when the menu key is pressed or the encoder is operated, the menu is closed.
2	CN601	SENSOR INPUT	SENSOR THE WATER LEVEL AND WATER TEMPERATURE.
3	CN701	Drum Light	Turn on when door is opened.
4	CN401	FLASH WRITING	WRITING PROGRAMME TO SUB.
5	CN201	GRAPHIC PBA Connection Port	For communications with Graphic PBA.
6	CN402	TOUCH PBA COMMUNICATION	SUPPLY POWER TO TOUCH PBA AND COMMUNICATION TO SUB PBA

5-6. CIRCUIT DIAGRAMS OF MAIN PARTS FOR SUB PCB

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► **CN601**

1. Empty Pin
2. Led Signal
3. Led Signal
4. Led Signal
5. Led Signal
6. Led Signal
7. Led Signal
8. Led Signal
9. Led Signal
10. GROUND
11. JOG Signal
12. JOG Signal
13. Empty Pin

► **CN201**

1. Communications Port(Rx)
2. Communications Port(Tx)
3. Reset Signal input
4. 5V
5. GROUND
6. 12V
7. Empty Pin
8. POWER_SWI
9. Water level Signa
10. Empty Pin

► **CN402**

1. 12V
2. GROUND
3. SDA1
4. SCL1
5. Empty Pin

6. WIRING DIAGRAM

6-1. WIRING DIAGRAM

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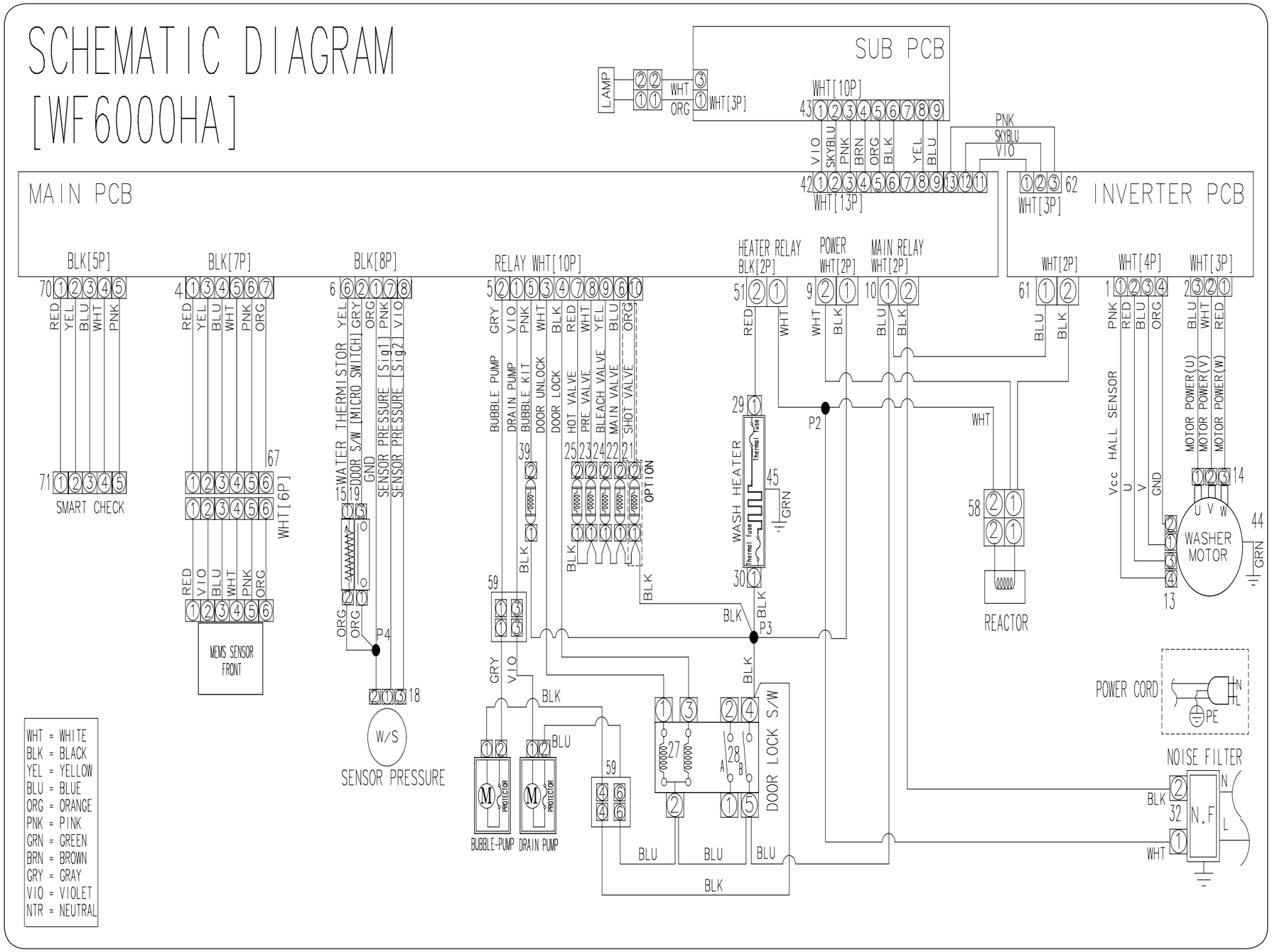
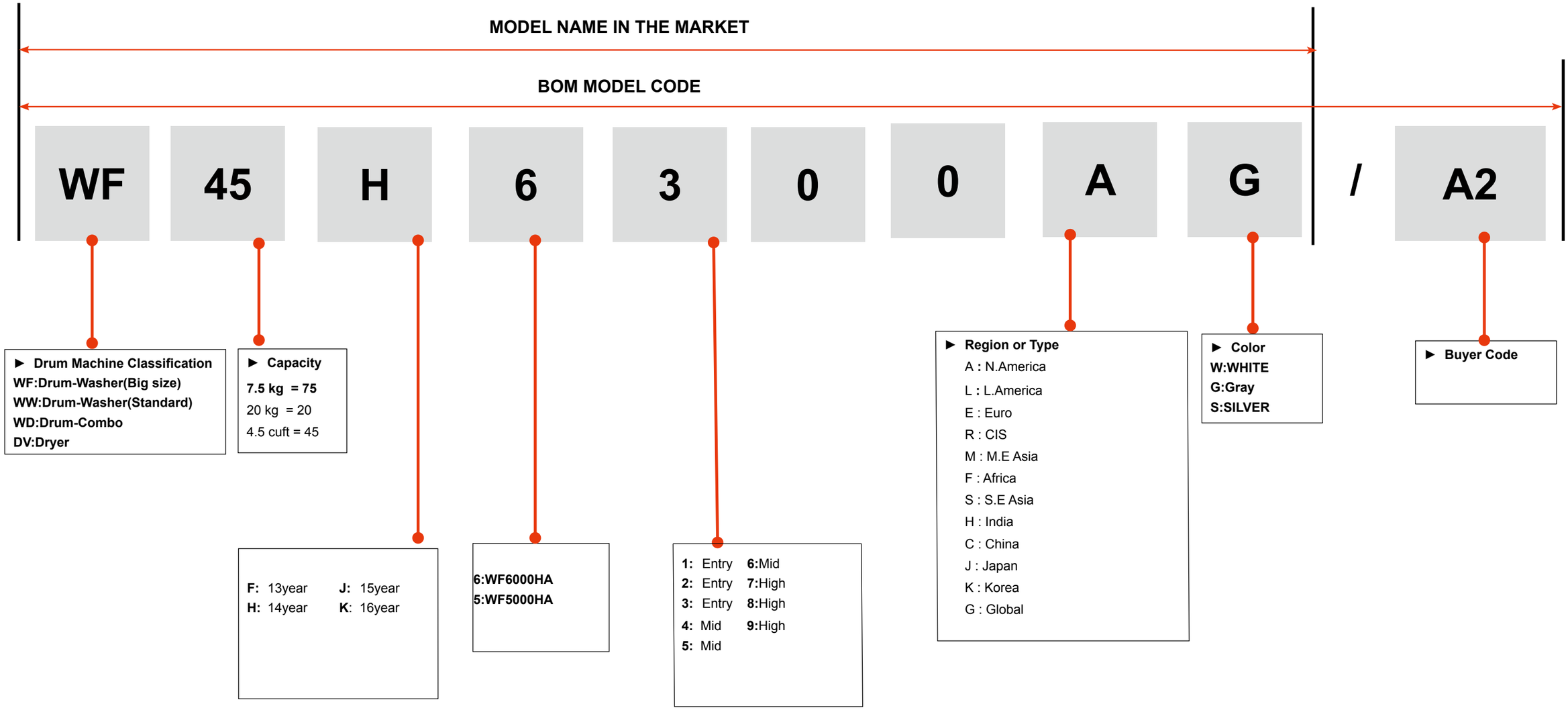
■ REFERENCE INFORMATION

BLK	BLACK
BLU	BLUE
GRN	GREEN
GRY	GRAY
NTR	NATURAL
ORG	ORANGE
PNK	PINK
RED	RED
SKYBLU	SKYBLUE
VIO	VIOLET
WHT	WHITE
YEL	YELLOW



7. REFERENCE

7-1. WF6000HA PROJECT NAME



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14 Nov. 2014